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- Message Board
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- 8052 FAQs
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- Code Library
- Chips
- Links
- Books
- Reviews
- Consultants
- User Pages
- 8052 Video
- 8052 TCP/IP
- 8052 CD-ROM
- Disassembler
- 8052.com SBC
- Site Members
- Contact Us
- About VIS
- Legal Info

Subject: RE: digital Filtering
Full Name: Nic Birsan (Ploiesti Romania)
Date: 16/Aug/02 2:24 am
Read: 125 times
Score: Hasn't been scored

As the analog filtering, digital filtering is a method to alter or remove unwanted freq components from a signal. (I guess you know about lowpass, highpass, bandpass and filters).

Generally, a filter has a form of:

$$y[n] = 1/a_0 * (B \times X - A \times Y)$$

where $y[n]$ is the output response

B is a k-dimension vector - contains forward coefficients;
X is a k-dimension vector - containing past k samples from the
A is a (n-1)-dimension vector - reverse coeff.
Y is a (n-1)-dimension vector - contains past n-1 outputs from

In most filter designs coefficient a_0 is =1 (anyway it can be contained in B vector).

Now, if A vector contains just null elements the filter will be an finite impulse response (FIR) if not the filter is called infinite impulse response (IIR- the output depends of the past assumed that it's response will be infinite) .

So, you can see - the implementation is not such a big problem - you must multiply simple filter is a moving average, that is all the elements from the B vector have the same weight =SAMPLE_COUNT.

The problem is what values to put in the A and B vectors - to design the filter - that your requirements. It can be designed in time or in frequency - I see Steve can help with responses.

Now about 8051 - this chip is not a good option for digital filtering, I have implemented maximum of 3-4 dimension arrays for low frequency.

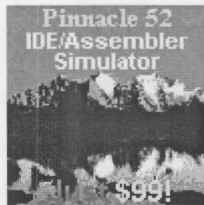
P.S. I was interrupted in the middle of my response - I agree with Peter - you must be careful with the problem.

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List of 11 messages in thread

Topic	Author	Date

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digital Filtering	farooq kamran	15/Aug/0
RE: digital Filtering	Charles Bannister	16/Aug/0
RE: digital Filtering	Peter Dannegger	16/Aug/0
RE: digital Filtering	Nic Birsan	16/Aug/0
RE: digital Filtering	Steve M. Taylor	16/Aug/0
RE: digital Filtering	farooq kamran	16/Aug/0
RE: digital Filtering	Steve M. Taylor	16/Aug/0
RE: digital Filtering	farooq kamran	16/Aug/0
RE: digital Filtering	Steve M. Taylor	17/Aug/0
RE: digital Filtering	farooq kamran	17/Aug/0
RE: digital Filtering	Steve M. Taylor	18/Aug/0

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Subject: moving average

Full Name: Peter Dannegger (Berlin Berlin)

Date: 14/Aug/02 7:44 am

Read: 505 times

Score: Hasn't been scored

Kunal wrote:

"Hey can anybody tell me a bit more about my moving average code? Is it right, is it innovative as I thought, or is it the normal way to go about it?"

Hi Kunal,

I started a new thread, to make it easier to search for this topic later.

Following an example written completely in C, maybe it was similiar to this, what y mean:

```
#define SAMPLE_COUNT      16

#define div_rnd(x,y)      ((x + (x >> 1)) / y)

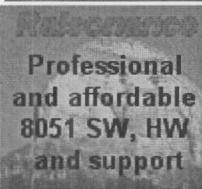
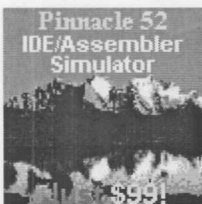
int moving_average( int val )
{
    static int samples[SAMPLE_COUNT] = { 0 };
    static char sample_no = 1;

    int aver = 0;
    char i;

    if( --sample_no == 0 )
        sample_no = SAMPLE_COUNT;

    for( i = SAMPLE_COUNT; i; i-- ){
        if( i == sample_no )
            samples[i-1] = val;
        aver += samples[i-1];
    }
    return div_rnd( aver, SAMPLE_COUNT );
}
```

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Now my previous example again, but it has a different characteristic. I know not if it also named "moving average":

```
adc_input[channel] -= adc_input[channel] / SAMPLE_COUNT
                    - (((uint)ADDDH << 2) | (ADDDL & 0x03));
```

Peter

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List of 12 messages in thread

Topic	Author	Date
moving average	Peter Dannegger	14/Aug/02 7:44 am
RE: moving average <small>New</small>	Charles Bannister	14/Aug/02 8:04 am
RE: moving average <small>New</small>	Steve M. Taylor	14/Aug/02 12:44 pm
RE: moving average <small>New</small>	Jon Ward	14/Aug/02 1:38 pm
RE: moving average <small>New</small>	erik malund	14/Aug/02 1:49 pm
RE: Steve <small>New</small>	Peter Dannegger	15/Aug/02 12:16 am
RE: moving average <small>New</small>	Peter Dannegger	15/Aug/02 12:30 am
RE: moving average <small>New</small>	Peter Dannegger	15/Aug/02 5:26 am
RE: Peter.	Steve M. Taylor	15/Aug/02 5:28 am
RE: moving average <small>New</small>	Jon Ward	15/Aug/02 7:57 am
RE: moving average <small>New</small>	Kunal Kandekar	15/Aug/02 8:59 am
RE: moving average <small>New</small>	Jon Ward	15/Aug/02 5:30 pm

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Subject: RE: moving average
Full Name: Steve M. Taylor (Manchester Uk) **Moderator**
Date: 14/Aug/02 12:44 pm
Read: 115 times
Score: Hasn't been scored

An often better filter characteristic that is fairly easy to implement is the "Exponential forgetter", which is the function

$$\text{Filter}(n) = \text{sample} * K + (1-k)\text{filter}(n-1)$$

$$0 < k < 1$$

As K reduces the filter gets "slower". We often bits that kick out samples that are X² away from the "mean" output.

Steve

Can't Reply -- Old Thread is Locked | Back To Subject List

List of 12 messages in thread

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moving average	Peter Dannegger	14/Aug/02 7:44 am
RE: moving average	Charles Bannister	14/Aug/02 8:04 am
RE: moving average	Steve M. Taylor	14/Aug/02 12:44 pm
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